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MAP NOTICES.

Rain and Snow of the United States, compiled to the end of 1891, with seasonal, monthly and other charts. By Mark W. Harrington, chief of the Weather Bureau, Washington, 1894.

The U. S Weather Bureau published, last October, as Bulletin C, an atlas containing maps showing the mean precipitation for each month, each season and for the year, and following it, a bulletin containing the data upon which the maps are based. In this is given the precipitation in each year of record at 1,073 stations, being by far the most complete compilation of the kind ever made in this country. It contains, also, the mean monthly rainfall at 103 stations, besides much other valuable data.

The execution of the maps is not in keeping with the value of the data which they present.

In preparing a precipitation map, as in preparing any other map, one has measurements at certain points, which serve as guides in sketching lines. In this case the data consist of rainfall measurements at a few hundred points scattered over the country. At these points, each the size of a rain gauge, we may say we have data, though it is, at best, rather uncertain data.

The rainfall at any station ranges widely from year to year, so much so that an average of less than ten years is likely to be misleading. The rainfall is so greatly affected by local topography, and even by the situation of the gauge, that the result from a single station may differ widely from those of neighbouring stations. On these accounts, it is advisable, wherever possible, to use the mean rainfall of several years at each station, and to use the mean of several neighbouring stations, instead of using the data from stations individually.

The rainfall over the areas between these points of observation is related to that at these observed points, in accordance with known laws, dependent upon the relief of the country, the source of the moisture and the direction of winds. A knowledge of the laws of rainfall, the relief of the country and its influence upon rainfall, are therefore absolutely necessary in preparing rainfall maps.

In the maps before us it would seem that sufficient consideration has not been given to these important points. Although, on the score above suggested, these maps are not all that could be desired, they give a much better idea of the distribution of rainfall than any heretofore published. The gradual diminution of the annual rainfall inland from the Atlantic and northward from the Gulf, the two main sources of moisture; its diminution westward, on the slope of the Great Plains; and eastward from the Pacific Coast, are clearly shown.

The maps showing monthly and seasonal rainfall develop the peculiarities of distribution through the year of the rainfall of the plains and Rocky Mountain region. They show the heavy rainfall on the Pacific coast in winter, by which the moist air currents from the Pacific are drained, leaving them to flow over the Rocky Mountains as dry winds; while in Summer these same moist air currents disgorge but little moisture on the hot Pacific coast, and, passing over into the Rocky Mountain region as moist winds, give that country a rainy season in summer.

Epoch Maps, Illustrating American History, by Albert Bushnell Hart. Longmans, Green & Co., New York, 1893.

This little atlas comprises a series of fourteen maps of the United States and North America, illustrating principally the changes of territory in colonial and later times.

It contains a map of the physical features of the United States; a map of North America, showing territorial claims in 1650; of eastern North America, showing the English colonies in 1700; of North America, showing territorial claims in 1750; the English colonies between 1763 and 1775; the United States in 1783, at the close of the Revolution; the accessions of territory to the United States; the status of slavery in the United States in 1801 and 1825; sketches showing the principal territorial controversies between the United States and other Powers; the United States in 1855, 1861 and 1891.

This is a very interesting series of maps, but they give one the impression of being merely samples, since there is a great deal of territorial history to be filled in between the dates which these maps represent. For instance, in the formation of States and Territories there are many events which are not represented here; indeed, those omitted are many times those represented. A full series of such maps illustrating the changes in State and Territorial boundaries is a thing to be desired.

In looking them over we find several minor errors which should be corrected in a future edition. For instance, in map No. 7, Territorial Growth, the southern boundary of the original territory of the United States should be placed throughout on the 31st parallel, as established by the provisional treaty of peace. The Louisiana Purchase should be limited by the boundaries of Texas, the 100th meridian and the Arkansas River, as established by the treaty of 1819 with Spain. At the time of its acquisition it had no well-defined limits. Texas never extended up into Wyoming, but it did extend to the Arkansas River on the north and to the Rio Grande on the west. If there were ever any question about this it is settled by the fact that the United States paid Texas $10,000,000 for the areas ceded, which are now in New Mexico, Colorado, Kansas and Oklahoma. The area south of the 31st parallel, between the Perdido River and Lake Pontchartrain, was long in dispute between the United States and Spain, and in 1812, seven years before the purchase of the Floridas, the United States divided this area among Louisiana, Mississippi and Alabama, but its act in thus disposing of the territory in dispute did not give us jurisdiction over it, since Spain, the owner of the Floridas, was not a party to it.

Oregon is said to have been acquired in 1805 by the Lewis and Clarke expedition. We were not aware that these explorations made acquisitions of territory. The acquisition of Oregon was a gradual process brought about by discovery and settlement, and was not completed until the Webster-Ashburton treaty in 1847.

The last map, showing the status of the States and Territories in 1891, distinguishes the thirteen original States, including Maine, presumably as being a part of Massachusetts. If this be so, there is no good reason for not including Vermont as a part of New York; Kentucky, and, indeed, the whole Northwestern Territory, as a part of Virginia; Tennessee as a part of North Carolina, and Alabama and Mississippi as a part of Georgia.

Referring again to the earlier maps of this little work, it should be said that it is difficult in the extreme to delimit upon maps boundaries which are loosely and vaguely stated in unsettled and unexplored regions, and the author has perhaps done as well as it is possible to do.

Kultur-Karte der V. S. von Amerika, masstab 1:10,000,000, Verlag von R. Oldenbourg in München.

This map makes an attempt to show, on one sheet, a variety of physical and statistical data, including the magnitude of cities, the distribution of the coloured race and the Indians, the iron and coal fields, the wheat, corn and cotton regions, the Great Plains and the arid region, and our railroad system. The mixture thus produced is not very successful, owing to its complexity. The regions are in many cases in nature superimposed one over another, but on the map the right of way is, in some cases, given to one product, at the expense of others. Thus, while cotton and the negro are practically coextensive, the latter's range is greatly restricted on the map in order to show that of the former. Indeed, cotton seems to be the favourite, for its range is made to include much of southern California and central New Mexico. Wheat is similarly forced to give way to corn, and corn to cotton.

Rand, McNally & Co.'s Physical Geography of North America.

This is a wall map, on a scale of about 90 miles to 1 inch, showing by tints the elevation in the following grades:

Below sea level, sea level to 1,000 feet, 1,000 feet to 3,250 feet, 3,250 feet to 6,500 feet, above 6,500 feet.

Isothermal lines are added for certain degrees Fahrenheit for January and July, and the northern limits of certain forms of vegetation are indicated.

It is a very useful map for school and lecture purposes.

Mortalità per Infezione Malarica in ciascun Comune del Regno d'Italia nei Tre Anni 1890–91–92. Scala 1:1,000,000. Direzione Generale della statistica del Regno, 1894.

This map, compiled by Signor L. Bodio, Director-General of Statistics, shows the death rate per 1,000 inhabitants from malarial disease, in ten grades of colour. It shows that in North Italy, including the northern half of the Peninsula, deaths from this disease are comparatively rare, but that southward over the Peninsula, in Sicily and especially in the Island of Sardinia, it is much more prevalent and fatal, particularly in scattered localities.

Geological Map of Alabama with Explanatory Chart, Geological Survey of Alabama. Montgomery, 1894.

The Geological Survey of Alabama has been in existence for twenty-one years, and the publication of this map of the State appropriately marks the attaining of its majority. The energies of the Survey have been very properly directed largely to the solution of economic problems connected with the enormous mineral resources of the State, but this publication affords ample evidence that the purely scientific problems have not been neglected.

The scale of the map is ten miles to the inch, making a sheet 22 by 36 inches within the mat lines. The base, compiled from the Land Office records and atlas sheets of the U. S. Geological Survey, is by far the best map of the State in existence for general purposes. The land lines, while detracting from its appearance, doubtless add largely to its value for many local uses.

The geological formations are represented by a combination of colours and patterns, eighteen distinctions being obtained in the post-Paleozoic and thirteen in the Paleozoic and olden formations. The colours are skillfully selected so as to produce a pleasing effect and at the same time render the map easily read. The larger geological divisions of the State are clearly brought out by the grouping of the colours so that it serves well as a wall map. A careful examination shows that the geological subdivision has been carried fully up to the scale of the map, and in some cases beyond the scale. This is not noticeable in the flat Mesozoic and later formations, but in areas of Paleozoic rocks, particularly where they are steeply inclined, the outlines of the formations are considerably distorted by the exaggeration in width of the outcrops. If the faults of the valley region had been distinguished from the normal formation boundaries by some characteristic line, such as a series of dashes, the reading of the complicated structure would have been greatly facilitated. Of course the position of the faults can be determined in most cases by an examination of the relations of surface outcrops, but there is nothing on the map itself to indicate that some at least of the abnormal contacts may not be deposition unconformities. Considering the scale of the map and the absence of anything to distinguish faults, the highly complicated geology of some portions of the State, particularly of the Coosa valley, is very clearly represented. It is probable that the determinations of the age of some formations in this region are in error. Thus the small areas of sandstone in the vicinity of Rock Run classed as Silurian are without much question Devonian. These areas are small and of comparatively little importance except that they suggest the presence of a shore line in this region in early Devonian time.

The chart accompanying the map gives an excellent résumé of much scientific as well as economic information concerning the State.

Taken altogether this map of Alabama, in pleasing appearance and accuracy of delineation, probably surpasses any other State geological map thus far published, possibly excepting that of Maryland. It is to be hoped that so admirable an example may be followed by other States.

C. W. H.

Geological Survey of New Jersey. Report on Surface Geology for 1894, by Rollin W. Salisbury. From the Annual Report of the State Geologist. Trenton, N. J., 1895.

The three maps which accompany this report possess much interest for students of Pleistocene geology. They cover ground in some measure familiar to many glacialists, and the careful study and accurate delineation of the facts will make this a type region with which others less accessible may readily be compared.

The first of the three maps, prepared with the assistance of Messrs. Kümmell and Whitson, is particularly interesting to all who have followed the discussion concerning the recent formations of northern New Jersey. It is upon the diverse interpretation of these formations and similar ones in other regions that the opposing theories of one or several ice-invasions rest, and their importance has led to extremely detailed examination in the field. Prof. Salisbury represents eight phases of the glacial drift, of which six are extramorainic. Three of the latter are attributed to the last ice-invasion which formed the terminal moraine, and three either wholly or in part to a very much earlier glacial age. The map shows clearly the relations of these different phases of the drift to each other and to the moraine, and if the author's interpretation does not everywhere find acceptance, all will be indebted to him for the admirable manner in which the facts are exhibited.

The second map, prepared by Messrs. Salisbury and Peet, is on a large scale, showing the direction of glacial striæ on the Palisade Ridge opposite New York City. While the facts represented are not of so wide significance, this also is an important contribution to exact glaciology.

The third map, prepared jointly by Messrs. Salisbury and Kümmel, is a large-scale sheet covering the region west of Paterson and Newark, and showing the extinct Lake Passaic. This lake was formed at first by the ice front when it occupied the position marked by the terminal moraine and later by an ice dam at Paterson, the pre-glacial channel of the Passaic through the trap ridges at Milburn having been choked up by the moraine. At the time of its greatest extent the lake had a length of thirty miles and a width of ten. The old shore lines have been traced with evident care and numerous elevations of the various shore features are given. It is somewhat difficult to make out the deformation of the shore lines from these figures, and the isobases showing this deformation on a small diagram in the text might have been printed on the large-scale map with advantage.

C. W. H.

Grundzüge der Physikalischen Geographie von Guatemala. Von Dr. Carl Sapper. Mit 4 Karten. (Ergänzungsheft No 113 *zu "Petermanns Mitteilungen.") Gotha: Justus Perthes, 1894.*

This small work is the most succinct and valuable contribution to the physical geography that has as yet been published concerning any of the Spanish-American countries, and will prove an invaluable work of reference to workers in all lines of physical geography and geology. It represents the scientific results of a long residence by its author in the Republic of Guatemala. Three large coloured maps are appended which, although printed in somewhat incongruous tints, give a clear view of the hypsometric, geological and botanical features of the Republic. The work gives condensed chapters on the geology, orography, hydrography, climatology and plant geography, besides appendices giving a table of altitudes of over 800 points in the Republic, or an average of over seven to the square mile, concluding with a valuable bibliography of previous publications. The value of the geological observations accompanied by a map will be better appreciated when we learn that Dr. Sapper has called to his aid such valuable authorities as Drs. K. A. von Zittel, A. Rothpletz, C. Schwager, E. Nauman, Stoll and Roemer.

To the reader who wishes to obtain a succinct idea of the many grand geological phenomena concentrated in this little country, this will be an invaluable work of reference. The numerous volcanoes, the vast series of both sedimentary and eruptive rocks, including those from Azoic to Pleistocene age, are described in an intelligible manner. It is interesting to note the apparently authentic report upon the occurrence of the older Azoic and Paleozoic rocks in this region which are not well developed elsewhere between the southern line of the United States and the northernmost Republic of South America.

These contributions throw valuable light also upon the relations of the Antillean structure. Furthermore, in the chapter on orography the relations of the various uplifts and geologic evolution of the country are described. The hydrography of the streams flowing into the Bay of Honduras, the Pacific and the inland lakes is set forth with much detail. The chapter on climatology and the geography of the plants is especially thorough, showing a keen appreciation for the collection of just such data as will be of value to all interested in the geographical distribution of plants and animals. A valuable little table shows the range of altitude in which the plants are successfully cultivated, including coffee, cocoa, bananas, sugar, tobacco, rice, corn, and thirty other products.

The distribution and character of the rainfall are given, accompanied by six valuable climatological tables of different localities, giving the humidity, temperature and rainfall.

Could we possess such compact and valuable monographs of other Spanish-American countries and the Antilles, they would greatly aid the solution of many problems of physical geography for which the investigator vainly seeks the literature of those regions.

Map of North Eastern China, by Ch. Waeber, 1893. L. Friederichsen & Co., Hamburg. Relief by crayon shading.

Mercator's projection, scale of midlatitude, $18\frac{5}{10}$ miles to one inch. This map, in four sheets, represents the country between latitudes 30° and 43° north and longitudes 112° and 125° east. It is of special interest at present, as it represents the seat of war in China.

(Annales de Géographie, No. 14, 15 octobre, 1894.) Carte de l'Indo-Chine, dressée sous les auspices des Ministres des Affaires Etrangères et des Colonies, par M.M. les Capitaines Cupet, Friquegnon, et de Malglaive, Membres de la Mission Pavie. Echelle de 1: 2,000,000. 1895.

This map shows, in great detail for the scale, the portion of southeastern Asia between latitudes 8° and 24° north, and longitudes 95° and 107° east. Relief is expressed by crayon shading.

Map of part of British and German East Africa, including the British Protectorate of Uganda. Compiled in the Intelligence Division, War Office, under the direction of Lt.-Col. J. K. Trotter, 1894. Scale 25 miles to one inch. Relief by crayon shading.

This map represents that part of East Africa, east of Lakes Tanganika and Albert Edward, between latitudes 7° south and 2° north. Nothing, perhaps, more strongly characterises the rapidity of exploration in this part of the earth than a comparison of this map with those representing the same region a decade ago.

Carta geográfica del Ecuador, por Dr. Teodoro Wolf, publicada por órden del supremo Gobierno de la República, y trabajada bajo las presidencias de los E. E., señores Dr. D. J. M. Plácido Caamaño y Dr. D. Antonio Flores, 1892.

This map, published by Wagner and Debes, Leipzig, is in part a compilation from various sources, ancient and modern, supplemented by the original work of Dr. Wolf. It appears under the auspices of the Ecuadorian government.

The portion of Ecuador west of the main (Eastern) chain of the Andes is represented upon six sheets, on a scale of 1 : 445,000 (about 7 miles to an inch), the relief being expressed in hachures. The portion east of the Andes, occupying part of a single sheet, is represented on a scale of 1 :3,000,000 (48 miles to an inch), while the Galápagos Islands are represented on a third scale, that of 1 : 890,000 (about 14 miles to an inch.)

The map is accompanied by tables giving heights of notable mountains, cities, etc., and a list of the provinces and cantons.

Mapa de la Provincia de Catamarca construido segun datos recogidos y observaciones personales hechas en los años 1887–93 por Gunardo Lange, Ingeniero, Director de la sección Topográfica del Museo, y dibujado por Enrique Delachaux, Cartógrafo, director de la sección Cartográfica del Mismo Establecimiento. 1893. Escala de 1: 500,000. Museo de La Plata.

This map, printed in four sheets, forms a part of the Geographical Atlas of Argentina. It has been compiled from authentic data, and from personal observations by Gunardo Lange, Director of the Topographical Section of the Museum. Relief is represented by hachures.

This is a distinct addition to our knowledge of a little known region.

Atlas des Côtes du Congo Français, en vingt deux feuilles, à l'échelle, 1:80,000, Paris, 1893. Publié par le Sous-Secrétariat d'État des Colonies, Service Géographique. Photolithographed.

This map was made from a reconnoissance survey following the coast by Henri Pobequin, chief of station, in 1890 and 1891, using astronomical observations of J. Hansen. It shows little beyond the coast line and the settlements, native and French, upon the coast. Relief is shown crudely by contours at intervals of about 11 metres.

Atlas Général Vidal-Lablache Maître de Conférences de Géographie à l'école normale supérieure. 137 Cartes, 248 Cartons. Index Alphabétique de plus de 40,000 noms. Armand Colin & Cie, Paris, 1894.

This atlas comprises two parts, historical and geographic. In the first part are 52 plates, illustrating the political geography of past times, each plate being accompanied by explanatory notes. The history of the United States for the past two centuries is shown very inadequately on a single plate, while to Europe are devoted 44 plates, and to France alone 12 plates.

The Geographic part is an admirable collection of maps showing relief, climate, vegetation, geology, agricultural products, industries, transportation and political organization. An American might criticise the treatment of the United States in this part also, since only 5 plates out of 79 are devoted to it, while to Africa are assigned 7. The industrial and agricultural maps of this country (which are very small) are open to much criticism. The maps are finely engraved and well printed on heavy paper.

E. Debes, Neuer Handatlas, über alle Theile der Erde, in 59 Haupt- und weit über 100 Nebenkarten, mit alphabetischen Namenverzeichnissen. Leipzig, H. Wagner und E. Debes.

Parts 13, 14 and 15 of Debes' New Hand Atlas of all parts of the Earth have been received. Part 13 contains maps of Western Asia, Australia, and North America, and part 14 a political map of Europe, maps of South America and the Balkan Peninsula. Part 15 contains world maps showing relief and plant distribution, a map of Spain and Portugal, and one of Africa. These are accompanied by full indices. The execution is excellent.

United States Government Maps.

The U. S. Geological Survey has, during the year, issued 62 additional sheets of its great atlas of the United States, increasing the total number thus far published to 752. Of those issued during the past year, 46 are upon the scale of 1 : 62,500, or about one mile to an inch, and 16 are upon the scale of 1 : 125,000, or about two miles to an inch. Like the other sheets of this atlas, the relief upon these maps is shown by means of contour lines at intervals ranging from 5 to 100 feet.

Since these sheets constitute the first representation in detail of the country which they cover, they merit a somewhat extended mention. In Maine three sheets have been published. One, called the Bath sheet, shows a part of the intricate fiord-like coast of that State. The others, Norridgewock and Gray, are inland and are characterized by the forms of glacial erosion and deposition, which they represent. The North Conway sheet in New Hampshire shows part of the White Mountains, and the Londonderry sheet of Vermont a portion of the Green Mountains.

Eleven sheets lie in New York. Two, Elizabethtown and Mt. Marcy, are in the Adirondack region, the latter comprising some of the heaviest mountains in that region. Two sheets, the Kaaterskill and Durham, are in the Catskills. Others are in the Hudson and Mohawk valleys. The regions about Niagara Falls and Buffalo are represented upon sheets bearing those names.

From Pennsylvania there are five sheets, all in or near the anthracite region, and they are characterized by the long sharp ridges and narrow valleys of the Appalachian region. Three sheets from Virginia, known as Richmond, Bermuda Hundred and Petersburg, show a region of great interest to the historians of the late civil war. From southern Louisiana come four sheets, all in the delta of the Mississippi, showing the low-lying river ridges upon which the streams flow and the intervening swamps. From Wisconsin there is one sheet, upon which is represented the irregular debris, deposited by the great northern glacier. In the James River valley of the Dakotas are five sheets, showing broad stretches of nearly level land, where the only variations of surface have been produced by depositions from this glacier. In Nebraska and Kansas are ten sheets, representing typical forms of the plains. Two represent a part of the Black Hills of South Dakota. Three sheets represent part of the semi-desert of western Texas.

Three sheets are in southern Montana, embracing the country in the neighbourhood of the Yellowstone River. Two sheets are in Colorado, one upon the plains, and the other, sharply contrasted with it, represents the great mountain mass of Pike's Peak. In central Idaho are five sheets, showing a part of that terra incognita, commonly known as the Salmon River Mountains. There is one sheet in the Sierra Nevada of California, and the list closes with a sheet representing the country about Seattle, Washington.

These sheets are 17½ inches in height by 13 to 15 in breadth, and represent areas, upon the smaller scale, of 900 to 1,000 square miles each, and upon the larger scale, of 225 to 250 square miles each.

The U. S. Coast and Geodetic Survey has published during the year 49 charts, among them being, however, several re-engravings of work published previously on different scales. We note, however, new charts upon the eastern coast of Maine and upon the Alaskan coast. A new edition of the map of Alaska, containing the results of the latest explorations, is one of the above number.

Among them also is the map of the District of Columbia, scale 1 : 9,600, in five-foot contours, published in five sheets. This map, a part of which was published by photo-lithography some years ago upon a scale of 1 : 4,800, is the result of the joint survey executed by the U. S. Coast and Geodetic Survey and the authorities of the District of Columbia. It is very detailed, showing houses, gutters on the sides of the streets, and other minute differences of elevation. Owing to the rapid growth of the city since the surveys were made, the changes consequent upon building operations, the laying out of new streets, cuttings and fillings, etc., have been extensive, and the result is that the map now published fails to represent the country in many places. It is on such accounts questionable whether it is advisable to make so expensive maps as this (it cost $5.00 per acre) for general purposes, or of extended areas.

The United States Land Office has published during the year another edition of its admirable United States map, scale 40 miles to one inch. This is a great improvement in clearness over any previous issue. It has also published maps of Minnesota, Nevada, New Mexico and Montana upon a scale of 12 miles to an inch.

Over a large part of the United States these Land Office maps, which are compiled mainly from the township plats of land surveys, are the only source of information for atlas makers.

The U. S. Hydrographic Office has engraved on copper and published during the year 67 charts of various sorts. Of these, 55 are coast charts of different parts of the earth, 10 of them representing portions of our coast, and 45 relating to foreign coasts. Besides these, many charts of a general character have been published, mainly by lithography. Among them are the Pilot charts of the North Atlantic, issued monthly; of the North Pacific, issued in January and July, and a Pilot chart of the Great Lakes. These charts, besides being of the greatest value to navigators, are of special interest as illustrating the Physical Geography of the sea.